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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/748,468	12/30/2003	Jae Suk Lee	20059/PIA31212	7096

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EXAMINER
SMITH, BRADLEY

ART UNIT	PAPER NUMBER
2891	

DATE MAILED: 06/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/748,468	Applicant(s) LEE, JAE SUK	
	Examiner Bradley K. Smith	Art Unit 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213. *

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-18 is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☒ Claim(s) 7-9 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input checked="" type="checkbox"/> Other: <u>search notes</u> . |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 4, and 5 are rejected under 35 U.S.C. 102(e) as being anticipated by Ueno et al. (US Patent 6,737,336). Ueno et al. disclose forming a trench in a substrate; forming an oxide layer on sidewalls and a bottom of the trench; forming a metal or polysilicon layer on the oxide layer; etching a portion of the metal or poly-silicon layer to expose the oxide layer on the bottom of the trench while leaving the metal or polysilicon layer on the sidewalls of the trench; and depositing a dielectric material layer to fill the trench (figure 13). With regards to claim 4, the polysilicon layer contains polysilicon (see column 10 lines 14-28). With regards to claim 5, wherein the dielectric material contains an oxide(see column 10 lines 14-28).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ueno et al. (US Patent 6,737,336) in view of Beintner et al (US Patent 6,566,228). As disclosed above Ueno et al. disclose the formation of a shallow trench isolation structure. However Ueno et al. fail to disclose the trench is formed by a reactive ion etch method. Whereas Beintner et al. disclose the use of RIE. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Ueno et al. and Beintner et al. because the RIE will etch anisotropically to form a trench, has good control and is well known in the art.

6. Claims 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ueno et al. (US Patent 6,737,336) in view of Beintner et al (US Patent 6,566,228). As disclosed above Ueno et al. disclose the formation of a shallow trench isolation structure. However Ueno et al. fail to disclose the oxide layer contains LPTEOS oxide. Whereas Beintner et al. disclose the use of an LPTEOS oxide. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Ueno et al. and Beintner et al. because the LPTEOS is well known in the art.

7. Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ueno et al. (US Patent 6,737,336) in view of Beintner et al (US Patent 6,566,228). As disclosed above Ueno et al. disclose the formation of a shallow trench isolation structure.

However Ueno et al. fail to disclose the dielectric layer is formed by HDP CVD.

Whereas Beintner et al. disclose the use HDP CVD. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Ueno et al. and Beintner et al. because the HDP CVD will avoid the formation of holes or cavities.

Allowable Subject Matter

8. Claims 10-18 are allowed.

9. Claims 7-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record neither teaches nor suggests the forming a nitride layer on the LP-TEOS oxide layer; forming a PR pattern on the nitride layer; forming a LP-TEOS oxide pattern and a nitride pattern by etching the LP-TEOS oxide layer and the nitride layer using the PR pattern as a mask; removing the PR pattern; and etching the substrate to a predetermined depth using the nitride pattern as a mask (claims 7-9), and forming a trench in a substrate forming a first oxide layer on sidewalls and a bottom of

Art Unit: 2891

the trench; forming a second oxide layer on the first oxide layer; forming a PSG (Phosphor Silicon Glass) layer on the second oxide layer; and depositing a USG (Undoped Silicon Glass) layer to fill the trench (claims 10-18).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bradley K. Smith whose telephone number is (571) 272-1884. The examiner can normally be reached on 10-6 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on (571) 272-1722. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Brad Smith
Primary Examiner
Art Unit 2891